

REMARKS

Applicant appreciates the Examiner's indication that claims 10, 23, and 24 would be allowable if written to overcome the rejection under 35 U.S.C. § 112, second paragraph (based on intervening claim 2), and to include all of the limitations of the base claim and any intervening claims.

Applicant has amended claims 10 and 23 to be independent claims including limitations of claim 1 and the intervening claims. Claim 24 remains dependent from claim 23. Applicant also has corrected the cited informality with respect to intervening claim 2, thereby rendering moot the § 112, second paragraph rejection.

In the Advisory Action, the Examiner presented a new objection to claims 10 and 23, asserting that the claimed "controller and selector are not properly supported by 'means for' [recitations]." Although Applicant respectfully disagrees with this objection because nothing requires claim features to be in a means-plus-function format, Applicant has revised claims 10 and 23 to recite a "three-way valve," rather than a "selector," and to recite additional features of the "controller." Amended claims 10 and 23 recite the physical arrangement of the three-way valve and the controller, tying them to other claimed components. Both of these independent claims recite "a three-way valve arranged in the second circulating circuit and connected with the first heat exchanger, the first heat storing device, and the second heat exchanger; [and] a controller connected with the three-way valve and executing a switching operation of the three-way valve on the basis of an air conditioning demand, the controller comprising a microcomputer having a central processing unit, a memory unit, an input, and an output."

The original application fully supports the claimed three-way valve and controller. For example, three-way valve 27 is disclosed in Fig. 1 and at page 11, lines 8-13, of the present application. Support for the claimed controller is provided in Fig. 5 and at page 12, lines 8-11, of the present application, which describes an electronic control unit 33.

In response to the Examiner's comment in the Advisory Action regarding claim 23, Applicant has revised claim 23 to recite the "second heat storing device" as a claim element.

Applicant respectfully submits that claims 10 and 23 are in a condition of allowance for at least the reasons stated above.

Additionally, Applicant has cancelled now-superfluous dependent claims, and has amended the remaining dependent claims to depend from the respective allowable independent claims. All of the pending claims, therefore, are in condition for allowance.

The Examiner requested any subsequent actions by the European, Japanese, and Korean Patent Offices in foreign counterpart applications. Each of these offices has allowed respective counterpart applications. Copies of the respective patent office communications related to these allowances are attached. Also attached are copies of the front page portions of corresponding European and Korean patents and a corresponding Japanese patent publication, as well as English language versions of allowed claims for those matters.

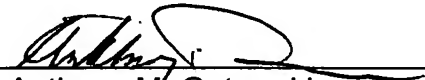
Applicant respectfully requests reconsideration of this application, withdrawal of the rejections and objection, and allowance of the present application.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: August 7, 2009

By: 
Anthony M. Gutowski
Reg. No. 38,742
(202) 408-4000

Attachments:

- 1. Decision to Grant a European Patent Pursuant to 97(1) EPC (April 17, 2008);**
- 2. Decision to Grant Japanese Patent Application (April 17, 2007); and**
- 3. Translation of Decision to Grant Korean Patent Application (July 28, 2006).**
- 4. Front page portion and claims of EP 1 533,154;**
- 5. Front page portion of JP 3953377 and English translation of claims; and**
- 6. Front page portion of KR 10-0635904 and English translation of claims.**



80298 MUNICH
GERMANY
Tel. +49 (0)89 2399 - 0
Fax +49 (0)89 2399 - 4455



For any questions about
this communication:
Tel +31 (0)70 340 45 00

Winter, Brandl, Föllme, Hübner, Ross, Kaiser, ...
Polte Partnerschaft Patent- und
Rechtsanwaltskanzlei
Alois-Steinecker-Strasse 22
85354 Freising
ALLEMAGNE

Eing.: 10.08.07

10.08.07

Frstl:

Date

17.04.08

Reference 58TY1402	Application No./Patent No 03736325.6 - 2425 / 1533154
Applicant/Proprietor Toyota Jidosha Kabushiki Kaisha, et al	

Decision to grant a European patent pursuant to Article 97(1) EPC

Following examination of European patent application No. 03736325.6 a European patent with the title and the supporting documents indicated in the communication pursuant to Rule 71(3) EPC dated 10.08.07 is hereby granted in respect of the designated Contracting States.

Patent No. : 1533154
Date of filing : 01.07.03
Priority claimed : 16.07.02/JPA 2002207469

Designated Contracting States
and Proprietor(s) : CZ FR GB IT DE
Toyota Jidosha Kabushiki Kaisha
1, Toyota-cho,
Toyota-shi, Aichi 471-8571/JP

DE
Denso Corporation
1-1, Showa-cho
Kariya-city,
Aichi-pref. 448-8661/JP

This decision will take effect on the date on which the European Patent Bulletin mentions the grant (Art. 97(3) EPC).

The mention of the grant will be published in European Patent Bulletin 08/20 of 14.05.08.

Examining Division

Endrizzi S

Grenbäck M

Westland P



Registered letter
EPO Form 2006A 12 07 11.04 08

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Reference No.: 27490000 Mailing No.: 183576 Mailing Date: April 17, 2007 1/E

Decision to Grant

Application No.:	2002-207469	
Issue Date:	April 13, 2007	
Examiner:	NAGASAKI, Yoichi	8610 3M00
Title of the Invention:	Air Conditioning System	
Number of Claims:	7	
Applicant:	Toyota Jidosha Kabushiki Kaisha (and one more applicant)	
Attorney:	WATANABE, TAKEO	

This application is granted since there is no reason to reject.

I authenticate that the mentioned above is exactly the same as what is recorded in the file.
The date of Authentication April 16, 2007
Officer of Ministry of Economy, Trade and Industry,
HIRASE, Emiko

Notice: The Patent Fee should be paid within 30 days form the day when this document is received.

korea

Translation of Decision to Grant Korean Patent application No. 2005-7000793

Decision to Grant

Applicant: TOYOTA JIDOSHA KABUSHIKI KAISHA

Attorney: KOREANA PATENT FIRM

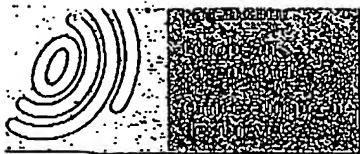
Application No.: 2005-7000793

Title of the Invention: Air Conditioning System

Number of Claims: 23

This application is granted under Article 66 of Korean Patent Act.

July 28, 2006



URKUNDE

Es wird hiermit bescheinigt,
dass für die in der Patentschrift
beschriebene Erfindung ein
europäisches Patent für die in der
Patentschrift bezeichneten Ver-
tragsstaaten erteilt worden ist.

CERTIFICATE

It is hereby certified that a
European patent has been granted
in respect of the invention
described in the patent specifica-
tion for the Contracting States
designated in the specification.

CERTIFICAT

Il est certifié qu'un brevet
européen a été délivré pour
l'invention décrite dans le
fascicule de brevet, pour les
Etats contractants désignés
dans le fascicule de brevet.

Europäisches Patent Nr.

European patent No.

Brevet européen n°

1533154

Patentinhaber

Proprietor of the patent

Titulaire du brevet

Toyota Jidosha Kabushiki Kaisha
1, Toyota-cho,
Toyota-shi, Aichi 471-8571/JP

Denso Corporation
1-1, Showa-cho
Kariya-city,
Aichi-pref. 448-8661/JP

Alison Brimelow

Präsidentin des Europäischen Patentamts
President of the European Patent Office
Présidente de l'Office européen des brevets

München, den
Munich,
Fait à Munich, le

14.05.08

(19)



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B60H 1/00 (2006.01)

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PCT/JP2003/008343

(87) International publication number:

WO 2004/007224 (22.01.2004 Gazette 2004/04)

(54) **AIR-CONDITIONING APPARATUS**

KLIMAAANLAGE

APPAREIL DE CLIMATISATION

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CZ DE FR GB IT

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(73) Proprietors:

- Toyota Jidosha Kabushiki Kaisha

Toyota-shi, Aichi 471-8571 (JP)

- Denso Corporation

Kariya-city,

Aichi-pref. 448-8661 (JP)

Designated Contracting States:

DE

(72) Inventors:

- TSUBONE, Kenji

1, Toyota-cho, Toyota-shi, Aichi, 471-8571 (JP)

- AIKAWA, Yasukazu

Kariya-shi, Aichi, 448-8661 (JP)

- HIJIKATA, Yasutane

Kariya-shi, Aichi, 448-8661 (JP)

(74) Representative: Winter, Brandl, Fűrnlss, Hübner

Röss, Kaiser,

Polte Partnerschaft Patent- und

Rechtsanwaltskanzlei

Alois-Steinecker-Strasse 22

85354 Freising (DE)

(56) References cited:

JP-A- 8 061 797

JP-A- 62 261 865

JP-A- 2003 004 321

US-A- 5 511 384

US-A1- 2001 020 529

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

[0115] A prime mover for running may be utilized as the prime mover for driving the compressor. In that case, if the prime mover is compulsorily driven by the running inertia force, it is possible to select the pre-heat storing mode in which heat storage is executed by driving the compressor by the running inertia force. As a result, regenerative energy amount is further increased so that fuel consumption of the vehicle can be improved.

[0116] The heat stored in the second heat storing device of the invention can be used for various applications. In order to regulate the air temperature, for example, it is possible to use the heat for air mix to provide heat to the air once cooled in the second heat exchanger. On the other hand, the heat may be used for heating or keeping heat of the oil or the internal combustion engine. Thus, the recovered heat can be used efficiently so that the fuel consumption of the vehicle is improved, and the emission can be reduced.

INDUSTRIAL APPLICABILITY

[0117] This invention can be utilized in the industrial field where air conditioning of a room, a working space and so on is executed, and a system therefor is manufactured. Moreover, this invention can be utilized in the field where a stationary air conditioning system or a mobile air conditioning system mounted on a vehicle is used or manufactured.

Claims

1. An air conditioning system (A1) cooling or heating air, and for feeding the heated or cooled air to predetermined portions, comprising:

- a) a first circulating circuit (B1) for circulating a first heating medium;
- b) a second circulating circuit (C1) for circulating a second heating medium;
- c) a first heat exchanger (18) for executing heat exchange between the first and second heating media; and
- d) a second heat exchanger (25) for executing heat exchange between the second heating medium and the air; characterized by further comprising:
 - e) a first heat storing device (8) having a heat storing material (14) which is heated or cooled by the first heating medium, for executing the heat exchange among the first heating medium, the second heating medium and the heat storing material (14); and
 - f) in that second circulating circuit (C1) comprises a first circuit (E1) in which flows the second heating medium through the first heat exchanger (18), a second circuit (H1) in which flows the second heating medium through the first heat storing device (8), and a selector (27) for communicating the second heat exchanger (25) selectively to the first circuit (E1) and the second circuit (H1).

2. The air conditioning system (A1) according to Claim 1, characterized by further comprising:

a controller (33) for executing a switching operation of the selector (27) on the basis of an air conditioning demand.

3. The air conditioning system (A1) according to Claim 2, characterized in that:

the controller (33) includes a means for executing a switching operation of the selector (27) so that the second heating medium flows through any one of the first heat exchanger (18) and the first heat storing device (8), which is more excellent in heat exchange characteristics than the other, in case the air conditioning demand is high.

4. The air conditioning system (A1) according to Claim 1, 2 or 3, characterized:

- a) in that the first heat exchanger (18) comprises a first flow passage in which flows the first heating medium, and a second flow passage formed adjacent to and in parallel with the first flow passage and in which flows the second heating medium; and
- b) in that a flowing direction of the first heating medium in the first flow passage and a flowing direction of the second heating medium in the second flow passage are opposite to each other.

5. The air conditioning system (A1) according to Claim 1, characterized:

in that the first heat exchanger (18) is arranged in an upstream side of the first heat storing device (8) in a flowing direction of the low-temperatured first heating medium; and

In that the selector (27) executes a switching operation to flow the second heating medium into the first heat exchanger (18) through the first circuit in case the rapid cooling is demanded, and executes a switching operation to flow the second heating medium into the first heat storing device (8) through the second circuit in case the normal cooling is demanded.

6. The air conditioning system (A1) according to Claim 1, characterized in that:

a second heat storing device (9) having a heat storage material (14) which receives heat from the heated and high-temperated first heating medium and stores the heat therein is arranged in the first circulating circuit.

7. The air conditioning system (A1) according to Claim 6, characterized by further comprising:

a heat source mechanism (1, 4, 6) for heating and cooling the first heating medium; and
a controller (33) for operating the heat source mechanism, in case the temperature of the heat storage material (14) in at least any one of the heat storing devices (8, 9) is at a predetermined value or lower, and air conditioning is demanded.

8. The air conditioning system (A1) according to Claim 6, characterized by further comprising:

a controller (33) which operates the first (circulating) circuit (B1) in accordance with a temperature of at least any one of the heat storing devices (8, 9), and which operates the second (circulating) circuit (C1) in accordance with the air temperature.

9. The air conditioning system (A1) according to Claim 8, characterized:

by further comprising a pump (28) for pressurizing and flowing the second heating medium; and
in that the controller (33) comprises a means for controlling an output of the pump (28) on the basis of a deviation between the air temperature and the target temperature at a predetermined position in the outlet side of the second heat exchanger (25).

10. The air conditioning system (A1) according to Claim 1 or 6, characterized in that:

any of the first heat storing device (8) and the second heat storing device (9) comprises a pipe penetrating the heat storage material (14) for flowing the first heating medium or the second heating medium therethrough, and a plurality of fins (13) embedded in the heat storage material (14) and integrated with the pipe (28).

11. The air conditioning system (A1) according to Claim 6, characterized in that:

the second heat storing device (9) is arranged in an upstream side of the first heat storing device (8) in a flowing direction of the heated and high-temperated first heating medium.

12. The air conditioning system (A1) according to Claim 6 or 11, characterized by further comprising:

a fourth heat exchanger (26) for executing heat exchange selectively with the air; and
a third circuit (D1) for circulating a third heating medium between the second heat storing device (9) and the fourth heat exchanger (26), and for providing heat to the third heating medium in the second heat storing device (9).

13. The air conditioning system (A1) according to Claim 6, characterized in that:

a compressor (1) for pressurizing the first heating medium, a heat radiator (4) for radiating heat from the first heating medium, and an expander (6) for adiabatically expanding the pressurized first heating medium, are connected in series with the first heat exchanger (18) and the first heat storing device (8).

14. The air conditioning system (A1) according to Claim 13, characterized:

by further comprising a determining device (33) for determining permission and non-permission of operation of

the compressor (1) on the basis of the temperature of the heat storage material (14) in any one of the heat storing devices (8, 9); and
in that a hysteresis is set to the permissible temperature and non-permissible temperature of operation of the compressor (1).

15. The air conditioning system (A1) according to Claim 13, characterized:

by further comprising a thawing device (33, Step S816) for heating the first heat storing device (8) temporarily; and
in that the first heat storing device (8) stores energy for cooling, and the second heat storing device (9) stores heat for heating.

16. The air conditioning system (A1) according to Claim 15, characterized by further comprising:

a vehicle mounting the air conditioning system thereon; and
wherein the thawing device (33, Step S816) comprises a means for setting the amount of heat for heating the first heat storing device (8) on the basis of at least any one of a road information on which the vehicle is running, weather around the vehicle, a vehicle speed, an engine speed, outside temperature, an amount of heat necessary to air conditioning the room.

17. The air conditioning system (A1) according to Claim 13, characterized by further comprising:

a prime mover (51) for outputting a power for running the vehicle and for driving the compressor (1); and
a controller (33, Step S818) for selecting a pre-heat storing mode, in which heat is stored in the heat storing device or radiated by driving the compressor (1) by a running inertia force, when the prime mover (51) is driven compulsorily by the running inertia force.

18. The air conditioning system (A1) according to Claim 13, characterized by further comprising:

a selector valve (17) for switching the flowing direction of the first heating medium, into a direction from the compressor (1) through the heat radiator (4) and the expander (6) to the first heat storing device (8), and into a direction from the heater (1) through the first heat storing device (8) and the expander (6) to the heat radiator (4).

19. The air conditioning system (A1) according to Claim 18, characterized in that

the second heat storing device (9), which receives heat from the first heating medium and stores the heat therein, is arranged between a discharging port of the compressor (1) and the selector valve (17).

20. The air conditioning system (A1) according to Claim 19, characterized by further comprising:

a fourth heat exchanger (26) for executing heat exchange selectively with the air; and
a third (circulating) circuit (D1) for circulating a third heating medium between the second heat storing device (9) and the fourth heat exchanger (26), and for providing heat to the third heating medium in the second heat storing device (9).

21. The air conditioning system (A1) according to Claim 6, characterized by further comprising:

an air mix executing means (D1, 26) for providing heat of the second heat storing device (9) to the air cooled by the second heat exchanger (25), thereby heating the air.

22. The air conditioning system (A1) according to Claim 6, characterized by further comprising:

any of an internal combustion engine (51) and a drive unit having oil; and a controller (33) for providing heat stored in the second heat storing device (9) to any one of the internal combustion engine (51) or the drive unit, thereby executing either warming up of the internal combustion engine (51) or heating of the oil.

23. The air conditioning system (A1) according to Claim 22, characterized by comprising:

a means for warming up the internal combustion engine (51) by the heat of the second heat storing device (9),

while the internal combustion engine (51) is halted.

Patentansprüche

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1. Eine Klimaanlage (A1), die Luft kühlt oder erwärmt, die erwärmte oder gekühlte Luft an vorab bestimmte Abschnitte zuführt, und die Folgendes aufweist:

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- a) einen ersten Umlaufkreis (B1) für den Umlauf eines ersten Wärmetauschmediums;
- b) einen zweiten Umlaufkreis (C1) für den Umlauf eines zweiten Wärmetauschmediums;
- c) einen ersten Wärmetauscher (18) zum Durchführen eines Wärmeaustauschs zwischen den ersten und zweiten Wärmetauschmedien; und
- d) einen zweiten Wärmetauscher (25) zum Durchführen eines Wärmeaustauschs zwischen dem zweiten Wärmetauschmedium und der Luft;

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dadurch gekennzeichnet, dass sie weiterhin Folgendes aufweist:

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- e) eine erste Wärmespeichervorrichtung (8), die ein Wärmespeichermaterial (14) aufweist, das von dem ersten Wärmetauschmedium erwärmt oder gekühlt wird, um den Wärmeaustausch zwischen dem ersten Wärmetauschmedium, dem zweiten Wärmetauschmedium und dem Wärmespeichermaterial (14) durchzuführen; und
- f) dadurch, dass der zweite Umlaufkreis (C1) einen ersten Kreis (E1) aufweist, in dem das zweite Wärmetauschmedium durch den ersten Wärmetauscher (18) fließt, einen zweiten Kreis (H1), in dem das zweite Wärmetauschmedium durch die erste Wärmespeichervorrichtung (8) fließt, und eine Auswahlvorrichtung (27), um den zweiten Wärmetauscher (25) selektiv mit dem ersten Kreis (E1) und dem zweiten Kreis (H1) zu verbinden.

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2. Klimaanlage (A1) nach Anspruch 1, **dadurch gekennzeichnet, dass sie weiterhin Folgendes aufweist:**

eine Steuerung (33), um einen Schaltvorgang der Auswahlvorrichtung (27) auf der Grundlage einer Klimatisierungsanforderung durchzuführen.

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3. Klimaanlage (A1) nach Anspruch 2, **dadurch gekennzeichnet, dass:**

die Steuerung (33) eine Einrichtung aufweist, um einen Schaltvorgang der Auswahlvorrichtung (27) so durchzuführen, dass das zweite Wärmetauschmedium durch dasjenige aus dem ersten Wärmetauscher (18) und der ersten Wärmespeichervorrichtung (8) fließt, dessen Wärmetauschmerkmale besser als die des anderen sind, falls die Klimatisierungsanforderung hoch ist.

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4. Klimaanlage (A1) nach Anspruch 1, 2 oder 3, **dadurch gekennzeichnet:**

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- a) dass der erste Wärmetauscher (18) einen ersten Flussdurchlass umfasst, in dem das erste Wärmetauschmedium fließt, und einen zweiten Flussdurchlass, der benachbart zu und parallel mit dem ersten Flussdurchlass gebildet wird und in dem das zweite Wärmetauschmedium fließt; und
- b) dass eine Flussrichtung des ersten Wärmetauschmediums in dem ersten Flussdurchlass und eine Flussrichtung des zweiten Wärmetauschmediums in dem zweiten Flussdurchlass einander entgegengesetzt sind.

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5. Klimaanlage (A1) nach Anspruch 1, **dadurch gekennzeichnet:**

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dass der erste Wärmetauscher (18) auf einer stromabwärtigen Seite der ersten Wärmespeichervorrichtung (8) in einer Flussrichtung des niedrig temperierten ersten Wärmetauschmediums angeordnet ist; und dass die Auswahlvorrichtung (27) einen Schaltvorgang durchführt, um das zweite Wärmetauschmedium in dem Fall durch den ersten Kreis in den ersten Wärmetauscher (18) zu schicken, in dem die schnelle Kühlung verlangt wird, und einen Schaltvorgang durchführt, um das zweite Wärmetauschmedium durch den zweiten Kreis in die erste Wärmespeichervorrichtung (8) zu schicken, falls die normale Kühlung verlangt wird.

6. Klimaanlage (A1) nach Anspruch 1, **dadurch gekennzeichnet, dass:**

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eine zweite Wärmespeichervorrichtung (9), die ein Wärmespeichermaterial (14) aufweist, das Wärme von dem erwärmten und hochtemperierten ersten Wärmetauschmedium empfängt und die Wärme in sich speichert, in dem ersten Umlaufkreis angeordnet ist.

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 審査請求日 平成16年9月27日 (2004.9.27)

(73) 特許権者 000003207 (Owner of Patent Right)
 トヨタ自動車株式会社 (TOYOTA JIDOSHA
 愛知県豊田市トヨタ町1番地 KABUSHIKI KAISHA)
 (73) 特許権者 000004260 (Owner of Patent Right)
 株式会社デンソー (DENSO CORPORATION)
 愛知県刈谷市昭和町1丁目1番地
 (74) 代理人 100083888 (AGENT)
 弁理士 渡辺 丈夫 (TAKEO WATANABE)
 (72) 発明者 坪根 賢二 (INVENTOR KENJI TSUBONE)
 愛知県豊田市トヨタ町1番地 トヨタ自動
 車株式会社内
 (72) 発明者 相川 泰一 (INVENTOR YASUKAZU AIKAWA)
 愛知県刈谷市昭和町1丁目1番地 株式会
 社デンソー内

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(54) 【発明の名称】 空調装置

(57) 【特許請求の範囲】 (claims)

【請求項 1】

第1伝熱媒体を循環させる第1循環回路と、第2伝熱媒体を循環させる第2循環回路とを有し、

前記第1循環回路に、前記第1伝熱媒体と前記第2伝熱媒体との間で熱交換をおこなわせる熱交換器と、前記第1伝熱媒体の熱を蓄熱し、かつ、前記第1伝熱媒体と前記第2伝熱媒体との間で熱交換をおこなわせる第1蓄熱器とが配置されており、

前記第1循環回路における第1伝熱媒体の流れ方向で、前記熱交換器と前記第1蓄熱器とが直列に配置されており、前記第2循環回路が、前記熱交換器または前記第1蓄熱器に接続される経路に分岐されており、

前記第1伝熱媒体と前記第2伝熱媒体との間で熱交換をおこなう場合の熱が、前記熱交換器または第1蓄熱器のいずれを経由するかを制御する制御装置を有し、

前記第2伝熱媒体の持つ熱により、空気の温度を制御することを特徴とする空調装置。

【請求項 2】

前記制御装置は、空気の温度を低下させる冷却能力が高い特性の急速冷房モードと、前記冷却能力が前記急速冷房モードよりも低い冷房モードとを選択可能であるとともに、

前記制御装置は、前記急速冷房モードを選択した場合に、前記第1伝熱媒体と前記第2の伝熱媒体との間で熱交換をおこなう場合の熱が、前記熱交換器を経由するように制御する機能を、更に備えていることを特徴とする請求項1に記載の空調装置。

【請求項 3】

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Patented Claims of Japanese Patent No. 3953377 (JPA2002-207469)

1. An air conditioning system, comprising:

a first circulating circuit for circulating a first heating medium;

a second circulating circuit for circulating a second heating medium;

wherein a heat exchanger for executing heat exchange between the first and second heating mediums, and a first heat storing device for storing heat of the first heating medium and for executing heat exchange between the first and second heating mediums are arranged on the first circulating circuit;

wherein the heat exchanger and the first heat storing device are arranged in series in a flowing direction of the first heating medium in the first circulating circuit, and the second circulating circuit diverges to the heat exchanger and to the first heat storing device;

comprising a controlling device for controlling the heat to be exchanged between the first and second heating mediums to go through the heat exchanger or the first heat storing device; and

wherein air temperature is controlled by the heat of the second heating medium.

2. The air conditioning system according to Claim 1, wherein:

the controlling device is capable of selecting a cooling mode from a rapid cooling mode in which a cooling effect thereof to lower the air temperature is high, and a cooling mode in which the cooling effect thereof is lower than that of the rapid cooling mode; and

the controlling device further comprises a function of controlling the heat to be exchanged between the first and second heating mediums to go through the heat

exchanger in case the rapid cooling mode is selected.

3. The air conditioning system according to Claim 1, wherein:

the controlling device further comprises a function of controlling the heat to be exchanged between the first and second heating mediums to go through the first heat storing device in case a predetermined amount of the heat is stored in the first heat storing device.

4. The air conditioning system according to Claim 1, comprising:

a second heat storing device for storing the heat of the first heating medium, which is arranged in the first circulating circuit;

a third circulating circuit for executing heat exchange between the second heat storing device and a third heating medium; and

wherein air temperature is controlled by the heat of the third heating medium.

5. The air conditioning system according to Claim 1, wherein:

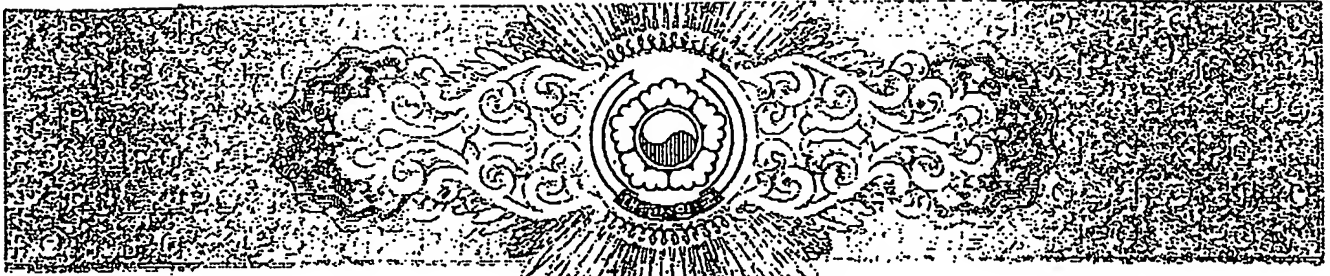
a flowing direction of the first heating medium in the first flow circulating circuit and a flowing direction of the second heating medium in the second circulating circuit are opposite to each other.

6. The air conditioning system according to Claim 4, wherein:

the controlling device further comprises a function of controlling the air temperature on the basis of the heats of the second and the third heating mediums.

7. The air conditioning system according to Claim 1, wherein:

wherein the heat exchanger and the first heat storing device are arranged in series in a flowing direction of the first heating medium of the case in which the cooling mode for lowering the air temperature is selected, to flow the first heating medium passing through the heat exchanger toward the first heat storing device.



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공조 장치

특허권자 (PATENTEE)

도요다 지도샤 가부시끼가이샤

일본 아이찌켄 도요다시 도요다쵸 1반지

발명자 (INVENTOR)

등록사항란에 기재

위의 발명은 「특허법」에 의하여 특허등록원부에 등록
되었음을 증명합니다.

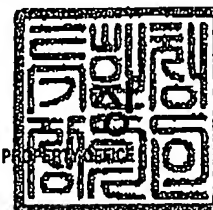
(THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE KOREAN
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2006년 10월 12일



특 허 청

COMMISSIONER, THE KOREAN INTELLECTUAL PROPERTY OFFICE



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(73) 특허권자 도요다 지도샤 가부시끼가이샤
일본 아이찌켄 도요다시 도요다쵸 1반지

(72) 발명자 츠보네겐지
일본 아이치켄 도요다시 도요다쵸 1반지 도요다 지도샤 가부시끼가이샤
나이

아이카와야스카즈
일본 아이치켄 가리야시 쇼와쵸 1쵸메 1반지 가부시끼가이샤 덴소 나이

히지카타야스타네
일본 아이치켄 가리야시 쇼와쵸 1쵸메 1반지 가부시끼가이샤 덴소 나이

(74) 대리인 특허법인코리아나

심사관 : 김충호

(54) 공조 장치

요약

본 발명은 공기를 가열 또는 냉각하고, 가열 또는 냉각된 공기를 소정 부분에 공급하는 공조 장치에 있어서, 제 1 가열 매체를 순환하는 제 1 회로, 제 2 가열 매체를 순환하는 제 2 회로, 및 제 1 가열 매체와 제 2 가열 매체 사이에서 열 교환을 실행하여 열교환기 또는 제 1 축열 장치 중 하나를 통해 흐르게 열을 제어하는 제어 장치를 구비하는 것을 특징으로 한다. 또한, 공기 온도는 제 2 가열 매체의 열에 의해 제어된다.

대표도

도 1

명세서

Translation of Allowed claims of Korean Patent No. 10-063590x

1. (DELETED)

2. (AMENDED)

An air conditioning system (A1) for cooling or heating an air, and for feeding the heated or cooled air to predetermined portions, comprising:

a first circulating circuit (B1) for circulating a first heating medium;

a second circulating circuit (C1) for circulating a second heating medium;

a first heat exchanger (18) for executing heat exchange between the first and second heating mediums;
and

a second heat exchanger (25) for executing heat exchange between the second heating medium and the air.

, characterized by further comprising:

a third heat exchanger (8), which is different from the first heat exchanger in heat exchange characteristics between the first and second heating mediums, and which is communicated in series with the first heat exchanger;

a selector (27) for selectively flowing the second heating medium through the first heat exchanger (18) or through the third heat exchanger (8); and

a controller (33) for executing a switching operation of the selector (27) on the basis of an air conditioning demand

3. The air conditioning system (A1) according to claim 2, characterized in that:

the controller (33) includes a means for executing a switching operation of the selector (27) so as to flow the second heating medium through any one of the first heat exchanger (18) and the third heat exchanger (8), which is more excellent in heat exchange characteristics than the other, in case the air conditioning demand is high.

4. The air conditioning system (A1) according to claim 2, characterized:

in that the first heat exchanger (18) comprises a first flow passage for flowing the first heating medium, and a second flow passage formed adjacent to and in parallel with the first flow passage and for flowing the second heating medium; and

in that a flowing direction of the first heating medium in the first flow passage and a flowing direction of the second heating medium in the second flow passage are opposite to each other.

5. (AMENDED)

An air conditioning system (A1) for cooling or heating an air, and for feeding the heated or cooled air to predetermined portions, comprising:

a first circulating circuit (B1) for circulating a first heating medium;

a second circulating circuit (C1) for circulating a second heating medium;

a first heat exchanger (18) for executing heat exchange between the first and second heating mediums; and

a second heat exchanger (25) for executing heat exchange between the second heating medium and the air.

, characterized:

by further comprising a first heat storing device (8) having a heat storing material (14) which is heated or cooled by the first heating medium, for executing the heat exchange among the first heating medium, the second heating medium and the heat storing material (14); and

in that second circulating circuit (C1) comprises a first circuit for flowing the second heating medium through the first heat exchanger (18); a second circuit for flowing the second heating medium through the first heat storing device (8); and a selector (27) for communicating the second heat exchanger (25)

selectively to the first circuit and the second circuit.

6. The air conditioning system (A1) according to claim 5, characterized:

in that the first heat exchanger (18) is arranged in an upstream side of the first heat storing device (8) in a flowing direction of the low-temperated first heating medium; and

in that the selector (27) executes a switching operation to flow the second heating medium into the first heat exchanger (18) through the first circuit in case the rapid cooling is demanded, and executes a switching operation to flow the second heating medium into the first heat storing device (8) through the second circuit in case the normal cooling is demanded.

7. The air conditioning system (A1) according to claim 5, characterized in that:

a second heat storing device (9) having a heat storage material (14) which receives heat from the heated and high-temperated first heating medium and stores the heat therein is arranged in the first (circulating) circuit.

8. The air conditioning system (A1) according to claim 7, characterized by further comprising:

a heat source mechanism (1,4,6) for heating and cooling the first heating medium; and

a controller (33) for operating the heat source mechanism, in case the temperature of the heat storage material (14) in at least any one of the heat storing devices (8,9) is at a predetermined value or lower, and air conditioning is demanded.

9. The air conditioning system (A1) according to claim 7, characterized by further comprising:

a controller (33) which operates the first (circulating) circuit (B1) in accordance with a temperature of at least any one of the heat storing devices (8,9), and which operates the second (circulating) circuit (C1) in accordance with the air temperature.

10. The air conditioning system (A1) according to claim 9, characterized:

by further comprising a pump (28) for pressurizing and flowing the second heating medium; and

in that the controller (33) comprises a means for controlling an output of the pump (28) on the basis of a deviation between the air temperature and the target temperature at a predetermined position in the outlet side of the second heat exchanger (25).

11. The air conditioning system (A1) according to claims 5 or 7, characterized in that:

any of the first heat storing device (8) and the second heat storing device (9) comprises a pipe penetrating the heat storage material (14) for flowing the first heating medium or the second heating medium therethrough, and a plurality of fins (13) embedded in the heat storage material (14) and integrated with the pipe (28).

12. The air conditioning system (A1) according to claim 7, characterized in that:

the second heat storing device (9) is arranged in an upstream side of the first heat storing device (8) in a flowing direction of the heated and high-temperated first heating medium.

13. The air conditioning system (A1) according to claim 7 or 12, characterized by further comprising:

a fourth heat exchanger (26) for executing heat exchange selectively with the air; and

a third circuit (D1) for circulating a third heating medium between the second heat storing device (9) and the fourth heat exchanger (26), and for providing heat to the third heating medium in the second heat storing device (9).

14. The air conditioning system (A1) according to claim 7, characterized in that:

a compressor (1) for pressurizing the first heating medium, a heat radiator (4) for radiating heat from the first heating medium, and an expander (6) for adiabatically expanding the pressurized first heating medium, are connected in series with the first heat exchanger (18) and the first heat storing device (8).

15. The air conditioning system (A1) according to claim 14, characterized:

by further comprising a determining device (33) for determining permission and non-permission of operation of the compressor (1) on the basis of the temperature of the heat storage material (14) in any one of the heat storing devices (8,9); and

in that a hysteresis is set to the permissible temperature and non-permissible temperature of operation of the compressor (1).

16. The air conditioning system (A1) according to claim 14, characterized:

by further comprising a thawing device (33, Step S616) for heating the first heat storing device (8) temporarily; and

in that the first heat storing device (8) stores energy for cooling, and the second heat storing device (9) stores heat for heating.

17. The air conditioning system (A1) according to claim 16, characterized by further comprising:

a vehicle mounting the air conditioning system thereon; and

wherein the thawing device (33, Step S616) comprises a means for setting the amount of heat for heating the first heat storing device (8) on the basis of at least any one of a road information on which the vehicle is running, weather around the vehicle, a vehicle speed, an engine speed, outside temperature, an amount of heat necessary to air conditioning the room.

18. The air conditioning system (A1) according to claim 14, characterized by further comprising:

a prime mover (51) for outputting a power for running the vehicle and for driving the compressor (1); and
a controller (33, Step S618) for selecting a pre-heat storing mode, in which heat is stored in the heat storing device or radiated by driving the compressor (1) by a running inertia force, when the prime mover (51) is driven compulsorily by the running inertia force.

19. The air conditioning system (A1) according to claim 14, characterized by further comprising:

a selector valve (17) for switching the flowing direction of the first heating medium, into a direction from the compressor (1) through the heat radiator (4) and the expander (6) to the first heat storing device (8), and into a direction from the heater (1) through the first heat storing device (8) and the expander (6) to the heat radiator (4).

20. The air conditioning system (A1) according to claim 19, characterized in that:

the second heat storing device (9), which receives heat from the first heating medium and stores the heat therein, is arranged between a discharging port of the compressor (1) and the selector valve (17).

21. The air conditioning system (A1) according to claim 20, characterized by further comprising:

a fourth heat exchanger (26) for executing heat exchange selectively with the air; and

a third (circulating) circuit (D1) for circulating a third heating medium between the second heat storing device (9) and the fourth heat exchanger (26), and for providing heat to the third heating medium in the second heat storing device (9).

22. The air conditioning system (A1) according to claim 7, characterized by further comprising:

an airmix executing means (D1,26) for providing heat of the second heat storing device (9) to the air

cooled by the second heat exchanger (25), thereby heating the air.

23. The air conditioning system (A1) according to claim 7, characterized by further comprising:

any of an internal combustion engine (51) and a drive unit having oil; and

a controller (33) for providing heat stored in the second heat storing device (9) to any one of the internal combustion engine (51) or the drive unit, thereby executing either warming up of the internal combustion engine (51) or heating of the oil.

24. The air conditioning system (A1) according to claim 23, characterized by comprising:

a means for warming up the internal combustion engine (51) by the heat of the second heat storing device (9), while the internal combustion engine (51) is halted.